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REMARKS

The present response is intended to be fully responsive to all points of objection and/or rejection raised by the Examiner and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested. Applicant would like to thank the Examiner for identifying issues in the application.

Applicant asserts that the present invention is new, non-obvious and useful. Prompt consideration and allowance of the claims is respectfully requested.

Status of Claims

Claims 80, 82, 87, 89 – 93, 95 – 102 and 104 - 105 remain pending in the application. Claims 80 - 105 have been rejected. Claims 80, 82, 87, 89 – 91, 93, 99 – 102, and 104 have been amended. New independent claim 125 – 126 have been added.

Claims 58 – 64, 66 – 74, 81, 83 – 86, 88, 94, 103, 106 – 108 and 112 have been canceled without prejudice or disclaimer. In making this cancellation without prejudice, Applicants reserve all rights in these claims to file divisional and/or continuation patent applications.

CLAIM REJECTIONS

35 U.S.C. § 112 Rejections

In the Office Action, the Examiner rejected claims 80-105 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 80 has been amended to claim a method for the preparation of a multi-phase composite material having properties and structure according to the intended use of said multi-phase composite material. The 'intended use' dictates the desired properties of the multi-phase composite material and thus dictates the interface materials to be used in order to obtain such properties. The 'intended use' also dictates the deposition of the interface materials having the different properties within different phases or regions of the multi-phase composite material,

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i.e. the structure of the multi-phase composite material. The kinds of properties desired are set forth in claims 97 and 98.

Claims 81, 83-86, 88, 94 and 103 have been cancelled and claims 80, 82, 87, 89 – 91, 93, 99 – 102, and 104 have been amended in order to more distinctly claim the subject matter. Accordingly, Applicant respectfully asserts that these amendments render claims 80, 82, 87, 89 – 93, 95 - 105 proper under 35 U.S.C §112 and requests that the rejections be withdrawn.

35 U.S.C. § 102 Rejections

Claims 80-103 are rejected under 35 U.S.C. § 102(b), as being anticipated by WO 00/11092.

Claims 80-85, 88-94, and 97-105 are rejected under 35 U.S.C. 102(b) as being anticipated by Helinski (5,136,515).

Claims 80-99 and 101-103 are rejected under 35 U.S.C. 102 (b) as being anticipated by Cima et al. (5,387,380).

Claims 80-98 and 101-104 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamane et al. (5,059,266).

Claims 80-94, 97-98 and 100-104 are rejected under 35 U.S.C. 102(b) as being anticipated by Napadensky in US 2002/0016386, published 02/07/2002.

As is well established, in order to successfully assert a *prima facie* case of anticipation, the Examiner must provide a single prior art document that includes every element and limitation of the claim or claims being rejected.

Claim 80 has been amended to further clarify what the Applicant considers to be an embodiment of the invention. Amended Claim 80 clearly recites: "generating data for preparing the multi-phase composite material having properties and structure according to the intended use of said multi-phase composite material by combining two or more of said interface materials into at least two types of said phases or regions".

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WO 00/11092.

According to the Examiner, "WO 00/11092 discloses a method for selective deposition of a modeling material for producing a three-dimensional article from phase change compositions having improved strength and toughness".

The Examiner admits that WO '92 does not specifically mention producing a multi-phase composite material, however the Examiner claims that the method of WO '92 would inherently produce such a material. The example given is the production of "a three-dimensional structure from compositions comprising a base material that encapsulates the remaining components and/or compositions comprising components such as a filler or wax that would be expected to provide a multi-phase material in a layer" (OA, p. 7, para. 2).

In either case: "compositions comprising a base material that encapsulates the remaining components" or "compositions comprising components such as a filler or wax" only a single interface material is used in the methods taught by WO '92.

The method disclosed by WO '92 teaches the production of a three-dimensional article by providing a container of a modeling material, in communication with a moveable dispensing unit, subjecting at least a portion of the solid material to an elevated temperature in order to produce a flowable liquid material and dispensing such flowable liquid in order to produce a three-dimensional article (WO '92, p. 6, para. 2). WO '92 thus teaches the deposition of a single modeling material in order to produce a three-dimensional article.

The method disclosed by WO 00/11092 does not teach producing a multi-phase composite material by dispensing two or more different interface materials from two or more corresponding dispensers to form at least two types of phases or regions of the multi-phase material, each comprising a different combination of said different interface materials, as claimed in claim 80.

The three-dimensional article according to WO '92 may have specific properties, but since only one material is used for producing the article, the relevant property would be the same along any and all axes in the material.

On the other hand, the method of preparing a multi-phase composite material, as claimed in claim 80, by necessity, involves dispensing two or more interface materials from

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two or more corresponding dispensers, such that different regions (phases) of the resulting multi-phase composite material have different properties.

The resulting multi-phase composite material is made up of different combinations of two or more interface materials, deposited in different phases of the composite whole, thus obtaining different combinations of properties in the different regions or phases of the whole. In this manner, for example, a multi-phase composite may have a greater amount of mechanically strong material in one region (phase) and in another region (phase) a greater amount of flexible material. In this manner, one may obtain a multi-phase material having both mechanical strength and elasticity, where one part of the material is more flexible than another or, for example, a material whose mechanical strength and/or elasticity is the same along one axis but different along another axis.

WO 00/11092, therefore, does not teach, either expressly or inherently, all the elements of independent claim 80. Accordingly, Applicant respectfully asserts that claim 80 is allowable and requests that the rejection be withdrawn.

Helinski (5,136,515)

Helinski (US 5,136,515) is directed to producing a three-dimensional object layer by layer by jetting droplets of at least two different materials, the first material forming the article itself and the second material forming a support for the article as necessary (see Abstract).

Each material produces a separate structure: the modeling material (fabrication particle material) produces a fabrication structure and the support material (support particle material) produces a support structure.

Claim 80, on the other hand, recites: "combining two or more of said interface materials into at least two types of said phases or regions" such that within the multi-phase composite material, each phase or region comprises two or more different interface materials.

Furthermore, Claim 80 recites: "curing or solidifying said two or more materials after deposition at a controlled temperature".

Helinski does not teach, either expressly or inherently, all the elements of independent claim 80 as amended. In particular, Helinski does not disclose, at least the above recited

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elements of claim 80. Accordingly, Applicant respectfully asserts that claim 80 is allowable and requests that the rejection be withdrawn.

Cima et al. (5,387,380)

Cima et al. (5,387,380) is directed to a process for making a component by depositing a first layer of a powder material in a confined region and then depositing a binder material to selected regions of the powder material to produce a layer of bonded powder material at the selected regions. Unbonded powder material is then removed (see Abstract).

The parts made by the process taught in Cima et al ('380) are formed from a single composition, which composition comprises bound powder. See, for example, the Abstract and Col. 2, line 67- col 3. line 5: "...powdered material, e.g., a powdered ceramic, a powdered metal or a powdered plastic, is deposited in sequential layers one on top of the other. Following the deposit of each layer of powdered material, a liquid binder material is selectively supplied to the layer of powdered material using an ink-jet printing technique..." (See). Thus the component consists of a single material.

Claim 80, however, recites "combining two or more of said interface materials into at least two types of said phases or regions" and further recites "selectively dispensing said two or more interface materials, layer by layer, in liquid form from two or more corresponding dispensers".

Cima et al. therefore does not teach, either expressly or inherently, all the elements of independent claim 80. In particular, Cima et al. does not disclose at least a method for the preparation of a "combining two or more of said interface materials into at least two types of said phases or regions" and "selectively dispensing said two or more interface materials, layer by layer, in liquid form from two or more corresponding dispensers", as recited in amended claim 80. Accordingly, Applicant respectfully asserts that claim 80 is allowable and requests that the rejection be withdrawn.

Yamane et al. (5,059,266)

Yamane et al. ('266) disclose a method for forming a three-dimensional article wherein a photosetting or thermosetting material is jetted from ink jet heads to a stage, laminated and exposed to light to cure.

The method disclosed by Yamane et al. does not teach producing a multi-phase composite material by dispensing two or more different interface materials from two or more corresponding dispensers to form at least two types of phases or regions of the multi-phase material, each comprising a different combination of said different interface materials, as claimed in claim 80.

Yamane et al. ('266) teaches that it is necessary for the photosetting resins of the invention to have a small viscosity to prevent clogging of the resin in the printing head. Inversely, if the article is formed of photosetting resin having small viscosity, the photosetting resin after lamination falls in drops during the photocuring process and/or the different resins mix or 'contaminate' each other where they meet (col. 7, lines 24-35). In order to overcome these problems, Yamane et al ('266) teaches "...irradiating light to a flight passage of the drops of the photosetting resin during a flight period of the drops of the photosetting resin from the ink jet head to the forming stage" (col. 7, lines 42-45) so that the resins are "partly photocured during the flight period" (col. 8, lines 8-9), and "as a result, the photosetting resin is prevented from clogging in the ink jet head ... and the article is accurately formed without dripping, blurring and so on.... Particularly, when plural different kind or color resins are used, the mixing or contamination of the resins is prevented at the boundaries where the kind or color of the resin is changed. Therefore, the resin article having a sharp color contrast or the like can be obtained." (col 8. lines 10-21).

Yamane et al. thus teaches against combining the materials within phases and in addition teaches against curing of the dispensed materials after their deposition.

Yamane et al. therefore does not teach, either expressly or inherently, all the elements of independent claim 80. In particular, Yamane et al. does not disclose at least a method for the preparation of a "combining two or more of said interface materials into at least two types of said phases or regions" and "curing or solidifying said two or more materials after deposition at a controlled temperature", as recited in amended claim 80. Accordingly, Applicant respectfully asserts that claim 80 is allowable and requests that the rejection be withdrawn.

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Napadensky in US 2002/0016386

The Examiner states that the 'phase compositions' set forth in the instant claims are defined in the disclosure as 'any composition suitable for building a three-dimensional object'. Napadensky '386 discloses a method corresponding to the limitations set forth in the instant claims and compositions to use in the method." [Office Action, page 9]

The term "phase compositions" does not appear in claim 80. Claim 80 as presently amended teaches a method for the preparation of a multi-phase composite material having properties and structure according to the intended use of said multi-phase material, said multi-phase material comprising a combination of at least two of at least two types of phases or regions, each comprising a different combination of interface materials.

Napadensky '386 does not teach the combination of two types of phases or regions within a multi-phase composite material, each phase or region comprising a different combination of different interface materials.

Napadensky et al. therefore does not teach, either expressly or inherently, all the elements of independent claim 80. Accordingly claim 80 is allowable.

Claims 82, 87, 89-93, 95-102, 104-105 and 125-126 depend directly or indirectly from claim 80, and thereby include all the limitations of claim 80 as well as additional distinguishing elements. Therefore, claims 82, 87, 89-93, 95-102, 104-105 and 125-126 are patentable for at least the reasons discussed above with regard to claim 80. Accordingly, Applicant requests that the rejections of claims 82, 87, 89-93, 95-102, 104-105 and 125-126 be withdrawn.

In view of the above remarks, Applicants respectfully request that the above rejections of claims 80, 82, 87, 89-93, 95-102, 104-105 and 125-126 under 35 U.S.C. § 102(b) be withdrawn.

Double Patenting Rejections

Claims 80-105 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-42 of U.S. Patent No. US 6,569,373 (Napadensky).

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In order to expedite the prosecution, Applicant hereby offers to provide a terminal disclaimer upon indication by the Examiner of allowable claims.

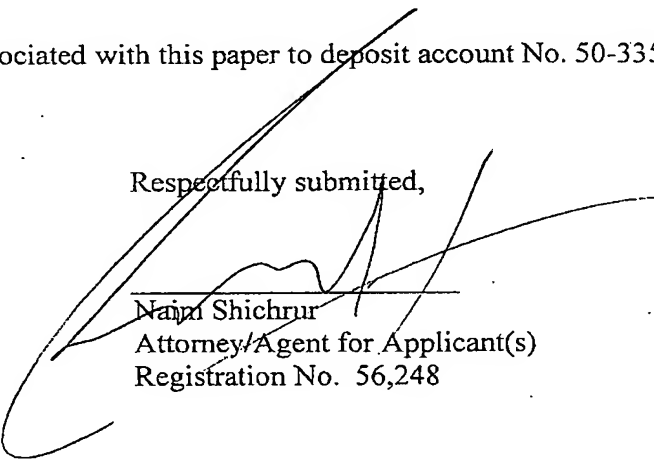
CONCLUSION

In view of the foregoing amendments and remarks, the pending claims are deemed to be allowable. Their favorable reconsideration and allowance is respectfully requested.

Should the Examiner have any question or comment as to the form, content or entry of this Amendment, the Examiner is requested to contact the undersigned at the telephone number below. Similarly, if there are any further issues yet to be resolved to advance the prosecution of this application to issue, the Examiner is requested to telephone the undersigned counsel.

Please charge any fees associated with this paper to deposit account No. 50-3355.

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